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George Dickie Lecturer on Botany Esq., A.L.S.

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Choquier. It is entirely enveloped, the height increases rapidly, its form is in consequence very discoid, and this distinguishes it from *A. Diadema*, with which it must never be confounded. The shell is extremely thin and very finely striated and plicated. The folds, as far as I have been able to observe, present no change in their direction. The lobes agree in all their characters, as has been already remarked, with those of the two preceding species. It remains generally very small, being seldom more than three-fourths of an inch in diameter.

XVIII—Remarks on the Reproductive Organs of the Lichens.

By GEORGE DICKIE, Esq., A.L.S., Lecturer on Botany at Aberdeen.

STARCH seems to be a product of almost universal occurrence in the vegetable kingdom; it is found in stems, roots, &c.; and in the parts of fructification of many plants, it is abundant, and appears to serve a very important purpose. It is plentiful in the disk of the almond, and Dunal has detected it in the disks of certain species of *Arum*; and it is supposed to undergo a certain change in order to render it fit to afford nourishment to the pollen and young ovules. Its presence in the ripe seed is well known, and its use during germination has been fully established. But starch is not confined to what are called the higher tribes of plants; it is also found in some which are generally allowed to stand low in the scale of vegetables. In 'Mag. Zoology and Botany,' vol. i. p. 382. I have stated that it occurs in the *nucules* of *Chara vulgaris*, and in the bodies, formerly called *capsules*, of *Pilularia globulifera*, in both of which it is also found along with a matter having all the properties of a fixed oil; it also occurs in those pyriform bodies which are found in the axillæ of the leaves of certain species of *Jungermannia*, 'Mag. Zool. and Bot.,' vol. i. p. 592. So that the bodies in the capsules of *Pilularia* are grains of starch and not sporules, and the contents of the anthers (of some authors) of *Jungermannia* consist also of the same substance. The bodies, which are found in the tubes (transversely undulated

filaments of Greville), contained in the globules of *Chara*, possess all the physical characters of starch globules; and although on account of their very small size I have been unable hitherto to ascertain satisfactorily the action of iodine upon them, still it is very probable that they are grains of fecula. The lichens which are placed still lower also contain starch, their thallus is the part to which it has been supposed to be confined, but even in this part it does not seem to be of universal occurrence, since I have been unable to detect it in the thallus of *Collema* and *Bæomyces* as specimens; however, if all the genera have not been tested, these are probably not the only two which do not contain it. But the reproductive organs of the lichens also contain a substance which is tinged blue by iodine. The thecæ or tubes which contain the sporules are the parts referred to.

The accompanying figure represents one of the thecæ (*t*) of *Pertusaria communis*; it consists of a fine transparent membrane, capable of being tinged blue by iodine, and containing in its interior a fluid matter in which the sporules (*s, s*) are immersed. Each sporule consists of a membrane similar to the thecæ, but not capable of being tinged blue by iodine like it. In the interior of each sporule there is a fluid in which numerous small globules are seen; they do not seem to possess any constant form. It has been already remarked, that iodine does not strike a blue colour with the thallus of *Bæomyces* or *Collema*; in the latter however the thecæ are tinged by it, but in the former there is no blue colour produced in any part. If the action of iodine entitles us to infer the presence of starch, the thecæ of the lichens must be considered a peculiar modification of it. From the investigations of Raspail, it appears that each starch globule has the power of producing in its interior other smaller globules, and that these last are (at one period) attached to the inner parietes of the mother cell.

Perhaps the thecæ of a lichen may be considered as a globule of starch of a peculiar form, in the interior of which other globules are produced, the sporules namely. I have not

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been able as yet to see any connexion of the sporules with the wall of the thecæ; they appear to float loosely in the fluid which surrounds them. If thecæ in a very young state were examined, some connexion might be found.

Some of the lichens are considered to be closely allied to certain forms of Algæ, and Raspail, in his Organic Chemistry, states his belief that the colours of many marine Algæ may be owing to a peculiar combination of iodine with starch; he also states that he has succeeded in tinging lichens with iodine so that they resembled some Algæ. I am not aware of any of the fungi which contain starch, in such a state, at least, as to afford a blue colour with iodine: now it has been already stated that the same is true regarding *Bæomyces*, and this genus has been considered to make a near approach to the fungi. Sir J. E. Smith compares the fructification of *Bæomyces roseus* to some minute *Helvella*.

XIX.—*Note on a Fossil Ruminant Genus allied to Giraffidæ in the Siwalik Hills.* By Capt. P. T. CAUTLEY.*

WHEN we look at the number of species of Proboscidean Pachydermata which swarmed in the primæval forests; when we see that in the present day nature appears to have left but solitary species to attest the gigantic form of primitive existence, the imagination naturally places before our eyes forms of corresponding magnitude in other genera; we picture to ourselves gigantic Ruminants and gigantic Carnivora only to be revealed by the remains which nature has placed in her own keeping to exhibit to inquiring man the wisdom of design and the systematic chain of organization established throughout the whole of the animal kingdom.

Amongst the Ruminants the discovery of the *Sivatherium giganteum* has most amply tended to prove the truth of this induction, exhibiting a ruminating animal bearing the same proportion to the rest of its genus as the Mastodon and Elephant do to that of the Pachydermata. Amongst the Carnivora we have the *Ursus Sivalensis*, an animal far exceeding in

* From the 'Journal of the Asiatic Society of Bengal,' No. 79, 1838.